Precise Target Localization in a Changing Pick & Place Environment

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I. INTRODUCTION

Industrial handling usually assumes fix environmental conditions: The points to teach in are expected to be at constant positions of the pick-up and place locations. However, in reality, the environment often moves at least minimally, leading to errors in handling and thus reducing the reliability of the system. The solution to be demonstrated is a combination of continuous screening of the working space and an algorithm to increase the precision of the placement. Inverse kinematics, visual object recognition and neural error compensation are combined to provide a self learning and robust pick & place system.

II. SETUP OF THE DEMO

The robot arm Katana of Neuronics® is equipped with a high-resolution black & white camera system. The visual software is directly coupled with the control software of the robot arm. A learning algorithm increases the precision for every point within an array of target points. The pick & place task is defined as follows: Grasp the randomly placed objects on the left side of the robot and put it precisely into the holes of a tray on the right side. The tray can be shifted by the user during the operation, and still the robot correctly places the objects in the respective holes.

III. APPLICATIONS

This principle setup can be used for applications in many industrial fields as well as in service robotics. Many task are nearly, but not completely, defined in terms of local positioning. For such cases, the Katana robot arm, equipped with camera and a vacuum gripper (see Figure) or with a finger gripper can solve the problem in an efficient, smart and reliable way. Additional documentation is available at www.neuronics.ch.